

UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

DRY HYDRANT

(Each)

Code 432

**DEFINITION**

A non-pressurized permanent pipe assembly system installed into water source that permits the withdrawal of water by suction.

**PURPOSE**

To provide all weather access to an available water source for fire suppression.

**CONDITIONS WHERE PRACTICE APPLIES**

Where a dependable source of water is available, where transport vehicles can access the site, and where a source of water is needed for fire suppression.

**CRITERIA**

**Site Conditions.** Site conditions shall be such that an all-weather vehicle access is available to the dry hydrant or can be developed. The dry hydrant shall be reasonably close to the water source to minimize the length of suction line. This should be determined in conjunction with local fire officials. Special care and maintenance will be required when debris and fine soil particles are part of the streambed.

**Water Requirement.** The quantity to be considered available to a dry hydrant is the minimum available (at not over 15 feet total static lift) during a drought having an average 50-year (2.0 percent chance) recurrence interval. A minimum of 30,000 gallons (1.1 acre-inches) of pumpable impoundment water or a minimum pump flow rate of 250 gpm without interruption for 2 hours is considered a dependable water supply.

**Location.** A location map showing the exact site of the hydrant and vehicle access shall be furnished to the local fire department with a copy to the landowner. A letter of approval to use the site shall be obtained from the landowner prior to construction. Access, topography, and location should be reviewed by fire department personnel prior to installation.

The fire truck connection shall be within 10 feet of the edge of an all-weather access road. The all-weather access road and fire truck pumper connection shall be higher than the auxiliary spillway elevation if installed in a constructed impoundment.

**Water Supply.** The adequacy of the water supply from impoundments shall be determined in accordance with appropriate local criteria. The RESOP or similar computer program can be used to determine the water supply contained by earthen construction or water impounding embankments. The adequacy of stream flow source can be determined from regional analysis of stream gage data.

**Pipe.** The pipe material may be iron, steel, or plastic. Plastic pipe shall be Schedule 40, SDR-26 or otherwise protected from ultraviolet rays. No more than two 90-degree elbows shall be used in the entire pipe system. Pipe shall be 6 inches nominal diameter or larger. The pipe shall be fitted with intake screen or strainer and standard fire truck hose adapters for quick connect/release operations acceptable to the local fire department.

The depth at which the pipe is installed shall be below the frost-free depth for the area.

**Pipe Intake.** The pipe intake depth shall be calculated from the design water elevation plus pipe diameter plus 2 feet unless a special

design, such as the slotted strainer, is used to prevent vortex. The intake screen should have a minimum opening of 4 times the pipe cross sectional area. Where the intake is more than 3 feet off the bottom, a trash rack may be used in lieu of a screen.

A dry hydrant installation shall provide for a positive slope toward the water source. In pits or impoundments, the intake screen or strainer shall be supported and secured at least two feet above the pool bottom. The intake shall be at least 4 feet beyond the earth slope.

To avoid a vortex or whirlpool during pumping, the top of the inlet pipe shall be at least 2.0 feet (1.0 ft. for slotted strainer) below the design water level (maximum drawdown level computer from the 50-year drought pool) unless a special design is prepared to prevent vortex.

Pump Lift. The top of the fire truck pumping connection or centerline of pump (whichever is higher) shall be no more than 15 feet in elevation above the bottom of the fire protection pool or stream surface during drought conditions.

The fire truck connection shall be approximately 24 inches above the ground surface, but never higher than the intake of the using fire truck.

The total lift (pumping head) shall not exceed 20 feet when all losses are totalled. Pumping head for each site shall include head loss from screen or strainer, elbows, line friction, elevation (static head), and hard rubber or flexible suction hose to the fire truck.

Dry Hydrant. Dry barrel (conventional) hydrants may not be used due to excess suction loss and the necessity that they be absolutely airtight.

A recessed hydrant (below ground-level connection) may be specified for use in areas with special needs, such as in a high vandalism area, or for low profile and esthetic needs. It is also referred to as a flush mount hydrant and does not require the 24-inch riser. It may be used with the 45° or straight dry hydrant head assembly.

Dry Hydrant Head. The hydrant sleeve shall be made of bronze, brass, aluminum alloy or other

durable, non-corrosive metal. Sleeve must be permanently affixed inside a PVC head using epoxy adhesive and stainless steel bolts.

The hydrant head shall be able to accept a 6-inch NHT (American National Fire Hose Thread) connection to provide maximum supply. Hydrant (6-inch) head shall conform to ASTM 2466.

All hydrants shall contain a removable head strainer and stainless steel snap ring that can be removed without special tools. The strainer shall be conical in shape to maximize straining area. All hydrants shall use a rubber "O" ring between the threaded sleeve and PVC head.

Dry Hydrant Cap. The cap shall be of snap-off, or quick-release, design and removable without special tools. It shall be joined with a steel cable or chain and be permanently attached to the dry hydrant head. The cap shall be plastic or of same metal as NHT connection for maximum corrosion resistance.

Strainer. The strainer shall be fabricated from PVC material compatible with the pipe. Individual inlet holes, or slots, shall not exceed 3/8-inch diameter/width. All components, including pins, shall be non-corrosive. Manufactured well screens shall be corrosion resistant. Screens and strainers shall have a minimum open area of 4 times the pipe cross sectional area.

A strainer may be formed by drilling 1/4 to 3/8-inch diameter holes with a minimum of one hole diameter slot width between the holes/slots in the PVC pipe. Slots shall be 1/4 to 3/8-inch wide cut circumferentially around the lower half of the pipe leaving a 1-inch rib along the center bottom of the pipe. Drill holes/slots shall be deburred and the pipe cleaned before putting the strainer into service. The screens or strainers shall be capped with a removeable end cap.

End Cap. The end cap must be easily removed without special tools. Perforations are recommended in the end cap also to improve flow conditions into the strainer and for jetting action for silt cleanout.

**Materials.** All materials shall meet or exceed the minimum requirements for materials described in the various sections of this standard.

**Access.** Vehicle access to and from the dry hydrant shall be provided for fire truck and pumper units. Access shall have an all-weather surface, be well drained and be at least 12 feet wide for ease of movement by personnel and equipment during an emergency. When local road traffic may be involved, an all-weather road surface adjacent to the dry hydrant and completely off the public road is recommended for safety of the emergency personnel and the public.

**Protection.** After the dry hydrant installation, the site shall be graded for surface drainage and vegetated or otherwise protected from erosion. Vegetation shall be in accordance with Critical Area Planting Standard and Specification (342).

## CONSIDERATIONS

1. Effect of the use of the dry hydrant on upstream and downstream water quantity.
2. Sediment production caused by erosion during construction.
3. Possible effects on surface and groundwater of spilled fuels and lubricants by fire trucks using the dry hydrant.
4. This practice has the potential to negatively affect National Register listed or eligible (significant) cultural resources (archaeological, historical, or traditional

culture properties); it also has the potential to protect listed or eligible historic structures. Consider these factors during planning and also follow the NRCS state policy during construction and maintenance.

## PLANS AND SPECIFICATIONS

Plans and specifications for installing dry hydrants shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Required permits shall be obtained prior to initiating any work.

## OPERATION AND MAINTENANCE

Keeping the site clear of obstruction and regular mowing of the dry hydrant access area will be required to keep the area readily available for emergency use.

Pumper testing of the dry hydrant shall be done at least annually to verify site usability. This test shall include back flushing, followed by a pumper test at the maximum designed flow rate. Careful attention should be given to silt, debris, aquatic growth, or other interference that may limit the full operation of the dry hydrant.

Checks of the intake screen should be made once every 5 years to identify any sediment build-up and to provide information for clean-out operation or for aquatic growth control needs. The hydrant should be back-flushed each spring and fall to remove any silt or debris that may have accumulated on the screen.



## **CONSTRUCTION SPECIFICATIONS FOR CODE 432 - DRY HYDRANT**

### **Site Preparation**

The dry hydrant access area and pipe location shall be cleared to the extent needed for pipe installation and access by fire fighting personnel and equipment. Clearing and brush removal for safe line-of-sight to the road shall be included. Clearing debris, logs, stumps, and other trash shall be burned, buried, removed from the site, or otherwise disposed of in accordance with state and local laws in a manner that does not interfere with hydrant installation or vehicle access. Any fence encountered within the construction area shall be carefully dismantled and laid back for later reconnection and relocation.

### **Excavation**

Excavation for placement of the dry hydrant pipe and riser shall be done by trenching or other approved methods. Excavation should begin in the pond and proceed toward the hydrant location. Trenches having cuts greater than 5 feet shall be sloped to a stable slope above the 5-foot height or braced to avoid side wall caving and to improve backfill compaction. Care must be taken during underwater excavation to avoid ridges and valleys in the bottom grade. The bottom grade shall have a positive slope toward the water source.

Excavation and shaping that will facilitate and enhance easy on/off road access to the dry hydrant shall be done. Such excavation and shaping shall provide a nearly level, well drained site which will also facilitate operation and maintenance activities.

### **Fill Placement**

If suitable, the material excavated from the pipe trench, access area shaping, or other source may be used for pipe backfill and other site filling and shaping activities. The fill material used in the trench must be free from all sod, roots, stones over two inches in diameter, frozen soil, and other objectionable material. Soil placed against plastic pipe shall be free of any isolated stones. A minimum of 2 feet of cover

perpendicular to the slope is required. The soil surface shall be mounded over the pipe for settlement and to divert surface water.

Fill material above water level shall be placed in thin layers not exceeding 9 inches thick and compacted. Compaction around the pipe above water level shall be by hand tamping or by manually directed power tampers. The sides of the trench shall be scarified to improve bonding with the fill material and minimize settlement. Gravel should be used as backfill below water level.

### **Construction Materials**

Pipe materials shall be of the specified type, size, and length as shown on the drawings. All pipe connections shall be air and water tight (airtight).

Pipe joint connections shall be cleaned and the appropriate cleaning and sealing material used according to the manufacturer's recommendations.

The intake screen shall be supported to assure that it has a minimum of 2 feet of clearance from the pond bottom.

Connectors acceptable to and approved by the local fire department shall be used.

### **Access**

Vehicle access to and from the dry hydrant shall be provided for fire truck and pumper units. Access shall be all-weather and acceptable to the local fire department. It should be at least 14 feet wide for ease of movement by personnel and equipment during an emergency. When public roads are used for access, an all-weather road surface adjacent to the dry hydrant and completely off the public road is recommended for safety of emergency personnel and the public. The fire truck connection shall be within 10 feet of the edge of an all-weather access road and fire truck pumper connection shall be higher than the emergency spillway elevation if installed in a constructed impoundment.